



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/337,278	06/22/1999	TAISUKE HIROOKA	990659	8796

23850 7590 03/25/2002

ARMSTRONG, WESTERMAN & HATTORI, LLP
1725 K STREET, NW.
SUITE 1000
WASHINGTON, DC 20006

EXAMINER

SMETANA, JIRI F

ART UNIT	PAPER NUMBER
----------	--------------

1746

DATE MAILED: 03/25/2002

/4

Please find below and/or attached an Office communication concerning this application or proceeding.

MF=14

Office Action Summary	Application No. 09/337,278	Applicant(s) HIROOKA ET AL.	
	Examiner Jiri F. Smetana	Art Unit 1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 February 2002.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,5 and 7-19 is/are pending in the application.
- 4a) Of the above claim(s) 11-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,5 and 7-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 June 1999 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413) Paper No(s). <u>13</u> |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Continued Prosecution Application

1. The request filed on 11 February 2002 for a Continued Prosecution Application (CPA) under 37 CFR 1.53(d) based on parent Application No. 09/337,278 is acceptable and a CPA has been established. An action on the CPA follows.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita et al., U.S. Patent no. 6,167,583, in view of Kanno, U.S. Patent No. 5,873,380.

Miyashita discloses a cleaning method of an electronic component wherein an object to be cleaned is cleaned by bringing a sponge member into contact with the object to be cleaned (column 1, lines 34-42) while supplying, to the object to be cleaned, water having a resistivity value of about 5 M Ω to 18M Ω (column 1, lines 22-25).

Miyashita does not disclose wherein the resistivity of cleaning water is adjusted by including carbon dioxide gas into the cleaning water. However, Kanno discloses wherein the resistivity of cleaning water is adjusted by including carbon dioxide gas into the cleaning water (column 7, lines 11-20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the resistivity of the cleaning water by including carbon dioxide gas because

Art Unit: 1746

Kanno teaches that damage of a wafer may be reduced by reducing the resistivity of pure water by mixing a carbon dioxide gas with the water, thereby reducing the static charge generated on the surface of the wafer (column 1, lines 38-41).

As to claim 1, since the prior art of Miyashita teaches a “resistivity of about 5 M Ω to 18M Ω ” (column 1, lines 22-23), such range of “about 5 M Ω to 18M Ω ” allows for lower resistivities, thus the ranges overlap. *In re Geisler*, 116 F.3d 1465, 1469-71, 43 USPQ2d 1362, 1365-66 (Fed. Cir. 1997). Further, a prima facie case of obviousness exists where the claimed range and prior art range do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America V. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985).

With respect to claim 5, it would have been obvious to clean ceramic wafers because both Miyashita and Kanno teach cleaning methods of generalized wafers or semiconductor devices, including ceramic or silicon.

4. Claims 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita et al., U.S. Patent no. 6,167,583, and Kanno, U.S. Patent No. 5,873,380, in view of Takehiko et al., JP 04-206724.

Miyashita discloses a cleaning method of an electronic component wherein an object to be cleaned is cleaned by bringing a sponge member into contact with the object to be cleaned (column 1, lines 34-42) while supplying, to the object to be cleaned, water having a resistivity value of about 5 M Ω to 18M Ω (column 1, lines 22-25).

Miyashita does not disclose wherein the resistivity of cleaning water is adjusted by including carbon dioxide gas into the cleaning water. However, Kanno discloses wherein the

Art Unit: 1746

resistivity of cleaning water is adjusted by including carbon dioxide gas into the cleaning water (column 7, lines 11-20). Further, Takehiko discloses wherein the resistivity of water is 0.1 to 3.0 M Ω by bubbling carbon dioxide into the water (abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the resistivity of the cleaning water by including carbon dioxide gas of a resistivity value of less than 5 M Ω because Kanno teaches that damage of a wafer may be reduced by reducing the resistivity of pure water by mixing a carbon dioxide gas with the water, thereby reducing the static charge generated on the surface of the wafer (column 1, lines 38-41) and Takehiko teaches that such low resistivity prevents electrification of a wafer during cleaning and prevents foreign matter from attaching to the wafer (abstract).

With respect to claim 5, it would have been obvious to clean ceramic wafers because both Miyashita, Kanno, and Takehiko teach cleaning methods of generalized wafers or semiconductor devices, including ceramic or silicon.

5. Claims 3, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita and Kanno as applied to claims 1 and 5 above, in view of Simmons et al., U.S. Patent No. 5,693,148.

Neither Miyashita nor Kanno disclose wherein the sponge member is separated from the object to be cleaned during cleaning, and cleaning water supplied also to the separated sponge. However, Simmons discloses wherein the sponge member is separated from the object to be cleaned during cleaning, and cleaning water supplied also to the separated sponge (column 3, lines 10-19; column 4, lines 3-6).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to separate the sponge member from the object to be cleaned during cleaning , and supplying cleaning water to the separated sponge because Simmons teaches that cleaning contaminants from the brush/sponge causes contaminants to be repelled from the brush/sponge, thus reducing or even eliminating brush/sponge load-up (column 2, lines 11-18), thus extending the useful lifetime of the brush/sponge (column 3, lines 1-2).

6. Claims 3, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita, Kanno, and Takehiko as applied to claims 1 and 5 above, in view of Simmons et al., U.S. Patent No. 5,693,148.

Neither Miyashita, Kanno, nor Takehiko disclose wherein the sponge member is separated from the object to be cleaned during cleaning, and cleaning water supplied also to the separated sponge. However, Simmons discloses wherein the sponge member is separated from the object to be cleaned during cleaning , and cleaning water supplied also to the separated sponge (column 3, lines 10-19; column 4, lines 3-6).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to separate the sponge member from the object to be cleaned during cleaning, and supplying cleaning water to the separated sponge because Simmons teaches that cleaning contaminants from the brush/sponge causes contaminants to be repelled from the brush/sponge, thus reducing or even eliminating brush/sponge load-up (column 2, lines 11-18), thus extending the useful lifetime of the brush/sponge (column 3, lines 1-2).

7. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita, Kanno, and Simmons as applied to claims 1, 3, 5, 7, and 8 above, in view of Chung et al., U.S. Patent No. 5,336,371.

Neither Miyashita, Kanno, nor Simmons disclose wherein the object to be cleaned is soaked in cleaning water having the resistivity value of $10\text{ M}\Omega$ or less before cleaning. However, Chung discloses wherein the object to be cleaned is soaked in cleaning water before cleaning (column 2, lines 54-62).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to soak the object to be cleaned in cleaning water before cleaning because Chung teaches that after a photolithography process and stripping of the photoresist, the photoresist stripper must be removed from the wafer by a process such as rinsing before further wafer processing (column 1, lines 23-25; column 3, lines 50-52).

8. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita, Kanno, Simmons, Takehiko as applied to claims 1, 3, 5, 7, and 8 above, in view of Chung et al., U.S. Patent No. 5,336,371.

Neither Miyashita, Kanno, Simmons, nor Takehiko disclose wherein the object to be cleaned is soaked in cleaning water having the resistivity value of $10\text{ M}\Omega$ or less before cleaning. However, Chung discloses wherein the object to be cleaned is soaked in cleaning water before cleaning (column 2, lines 54-62).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to soak the object to be cleaned in cleaning water before cleaning because Chung teaches that after a photolithography process and stripping of the photoresist, the photoresist

stripper must be removed from the wafer by a process such as rinsing before further wafer processing (column 1, lines 23-25; column 3, lines 50-52).

Response to Arguments

9. Applicant's arguments filed 9 January 2001 have been fully considered but they are not persuasive as described below.

10. Applicant argues that there is no motivation to combine Miyashita et al., U.S. Patent No. 6,167,583, in view of Kanno, U.S. Patent No. 5,873,380. Specifically, Applicant argues that since the present invention does not teach the collision of water with the wafer, as in Kanno, there would be no motivation to lower the resistivity of the water. However, Kanno is not used only to teach that the resistivity of the water is lowered. This limitation is already explicitly taught in the primary reference of Miyashita (column 1, lines 22-25). Kanno is used by the Examiner to teach that carbon dioxide gas can be used to adjust the resistivity of the cleaning water. Kanno does teach that collision of water against the wafer can cause harmful static charge, which is reduced by lowering the resistivity of the cleaning water. However, the harmful static charge is created by the motion of the water against and across the wafer. As in Applicant's invention, wherein there exists some sort of motion of pure cleaning water across the wafer, the risk of static charge occurring on the surface of the wafer is increased. And since the resistivity of the cleaning water in the primary reference of Miyashita already discloses a range of about 5 M Ω to 18 M Ω (column 1, lines 22-25), the motivation of lowering the resistivity of the cleaning water by carbon dioxide to reduce the static charge generated on the surface of the wafer is taught in Kanno.

11. Applicant argues that neither Miyashita nor Kanno disclose wherein the resistivity of the cleaning water should be below 5 MΩ. However, as explained in the prior Office Action, Paper No. 7, since the prior art of Miyashita teaches a “resistivity of about 5 MΩ to 18MΩ” (column 1, lines 22-23), such range of “about 5 MΩ to 18MΩ” allows for lower resistivities, thus the ranges overlap. *In re Geisler*, 116 F.3d 1465, 1469-71, 43 USPQ2d 1362, 1365-66 (Fed. Cir. 1997). Further, a prima facie case of obviousness exists where the claimed range and prior art range do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America V. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985).

12. Applicant argues that there would have been no motivation to combine Miyashita and Kanno in view of Takehiko et al., JP 04-206724. Particularly, Applicant argues that Miyashita does not suffer from problems associated with static charge. However, Takehiko teaches that prevention of electrification of the wafer surface and the prevention of foreign matter from attaching to the wafer surface can be greatly enhanced by adjusting the resistivity of the cleaning water with gaseous carbon dioxide (abstract). Therefore, Takehiko clearly teaches that foreign matter removal from the surface of the wafer is increased by the use of carbon dioxide. It is immaterial as to whether Miyashita acknowledges any problem associated with static charge, so long as Takehiko teaches a motivation to do so, along with the improved rate of removal of foreign matter.

13. Applicant argues that there is no suggestion from the prior art that the addition of carbon dioxide gas would increase the particle elimination rate. However, as explained above, Takehiko clearly teaches this motivation. In any event, it is not necessary that the prior art suggest the

Art Unit: 1746

combination to achieve the same advantage or result discovered by Applicant. *In re Lintner*, 173 USPQ 560 (CCPA 1972); *In re Dillon*, 16 USPQ2d 1897 (Fed. Cir. 1990). The reason or motivation to modify the references may often suggest what the inventor has done, but for a different purpose or to solve a different problem.

Conclusion

14. This is a continuation of applicant's earlier Application No. 09/337,278. All claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the earlier application. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action in this case. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no, however, event will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.


15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jiri F. Smetana whose telephone number is (703)605-1173. The examiner can normally be reached on Monday-Friday (7:30am-4:30pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy P. Gulakowski can be reached on (703)608-4333. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9310 for regular communications and (703)873-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0661.

Jiri F. Smetana
Patent Examiner
Art Unit 1746

jfs
March 11, 2002



RANDY GULAKOWSKI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700